# Curriculum Vitae for Evan Schankee Um
Geophysics Department, Earth Sciences Division,
Lawrence Berkeley National Lab
1 Cyclotron Road, Mail Stop 074-0101D
Berkeley, CA, USA 94720
Office:(510)-495-2172
Email: esum@lbl.gov; evanum@gmail.com

**Current Position:**

| | |
|---|---|
| Feb 2014-present | Geological Research Scientist, Geophysics Department, Earth Sciences Division, Lawrence Berkeley National Lab, CA, USA. |

**Education:**

| | |
|---|---|
| Fall 2006 – Spring 2011 | Ph.D. Geophysics, Stanford University, CA, USA. The title of Ph.D. dissertation: 3-D finite-element time-domain modeling of the marine controlled-source electromagnetic method (Advisors: Drs. Jerry M. Harris and David L. Alumbaugh) |
| Spring 2003 – Spring 2005 | M.S. Geological Engineering, University of Wisconsin-Madison, USA. The title of M.S. thesis: On the physics of galvanic source electromagnetic methods (Advisor: Dr. David L. Alumbaugh) |
| 1994 – 1998 | B.S. Earth and Environmental Sciences (Geology), Korea University, Seoul. |

**Previous Research Positions:**

| | |
|---|---|
| March 2011 – Jan 2014 | Postdoctoral Fellow, Computational Geophysics & Subsurface Imaging Group, Geophysics Department, Earth Sciences Division, Lawrence Berkeley National Lab, CA, USA (advisors: Dr. Gregory A. Newman and Dr. Michael Commer). |
| 2006 – 2011 | Research & Teaching Assistant, Geophysics Department, Stanford University, CA. |
| 2003 – 2005 | Research Assistant, Geological Engineering, Univ. of Wisconsin-Madison. |

**Previous Work Experiences:**

| | |
|---|---|
| July 2010 | Computational Geophysics Consultant, Saudi Aramco, Saudi Arabia |
| June 2005 – April 2006 | Geophysics Intern, Modeling, Inversion and Physics Group, Schlumberger-EMI, Berkeley, CA, USA |

**Research Experiences:**

1. Large-scale seismic-electromagnetic joint imaging for subsalt exploration (Phase 1: completed, LBNL; Phase 2: ongoing).
2. Finite-difference solution of the acoustic wave equation in the Laplace-Fourier domain (completed, LBNL).
3. Development of hybrid finite-element-finite-difference geophysical imaging methods (ongoing, LBNL).
4. Geophysical monitoring of fracture propagation and fluid flow in hydrofracturing operations (ongoing, LBNL).

5. Finite-element frequency-domain electromagnetic modeling algorithms with parallel direct and iterative solvers (completed, Stanford and LBNL)
6. Parallel finite-element time-domain electromagnetic modeling algorithms with parallel direct and iterative solvers (completed, Stanford and LBNL)
7. Joint geophysical imaging of enhanced geothermal systems at Raft River, Idaho (completed, LBNL)
8. Geophysical monitoring of Acquistore $CO_2$ sequestration in Saskatchewan, Canada and Ketzin, Germany (ongoing, LBNL)
9. 3D finite-element modeling Analysis of bathymetry effects on ocean bottom electromagnetic receivers in offshore environments (completed, Stanford).
10. On the governing physics of the controlled source electromagnetic geophysical methods in marine and land environments (completed, University of Wisconsin-Madison).

**Teaching Experiences:**

1. TA, Geological Engineering (Instructor: Professor Tom Holtzer, class size: about 25), 2010, Department of Geological and Environmental Sciences and Civil & Environmental Engineering at Stanford University
2. TA, Exploring Earth Sciences with MATLAB (Instructor: Professor Tapan Mukerji, class size: about 50), 2009, Department of Geophysics, Earth & Environmental Sciences and Earth Resource Engineering at Stanford University.

**Honors and Awards:**

1. Recipient, Stanford Graduate Fellowship in Science and Engineering (the top university-wide fellowship offered by Stanford University), 2008-2011.
2. Recipient, Computational Geosciences Fellowship, Stanford University, 2008.
3. Recipient, ConocoPhilips Fellowship, Stanford University, 2007.
4. Recipient, Littlefield Fellowship, Stanford University, 2006.
5. Recipient, Award for Excellence, College of Sciences, Korea University, 1997.
6. Recipient, Undergraduate Scholarship, Korea University, 1994 - 97.

**Grants:**

1. Co-PI with Professor Haohuan Fu (Center for Earth System Science, Tsinghua Univ., Beijing, China) for grants starting in 2014 from National Natural Science Foundation of China (NSFC): High-Performance 3D Finite-Element EM Earth Modeling.
2. Early Career Development Grants, Earth Sciences Division, Lawrence Berkeley National Laboratory (FY 2012 and 2013).
3.

**Organizations:**

1. A member, Society of Exploration Geophysicists (SEG)
2. American Geophysical Union (AGU)

**Journal Service:**

1. Special Editor for *Geophysics* (electric and electromagnetic methods; environmental geophysics; seismic modeling) since 2012.
2. Reviewer for *Technical Programs for SEG Annual Meeting* in 2011-2014

3. Reviewer for *Geophysics* since 2007.
4. Reviewer for *Geophysical Journal International* since 2010.
5. Reviewer for *IEEE Trans. on Geoscience and Remote Sensing* since 2011.
6. Reviewer for *Computers and Geosciences* (Springer) since 2012.

## Journal Publications (*corresponding author)

1. **\*Evan Um**, Michael Commer, Gregory A. Newman, 2014, A strategy for coupled 3D imaging of large-scale seismic and electromagnetic data sets: application to subsalt imaging, Geophysics, **79**, May-June, 1-13.
2. **\*Evan Um**, Michael Commer, Gregory A. Newman, 2013, Efficient pre-conditioned iterative solution strategies for the electromagnetic diffusion in the Earth: finite-element frequency-domain approach, *Geophysical Journal International*, **193**, 1460-1473.
3. **\*Evan Um**, David Alumbaugh, Jerry Harris and Jiuping Chen, 2012, Numerical modeling analysis of short-offset electric-field measurements with a vertical electric dipole source in complex offshore environments, *Geophysics,* **77**, E329-341.
4. **\*Evan Um,** Jerry Harris and David Alumbaugh, 2012, An iterative finite-element time-domain method for simulating electromagnetic diffusion in 3D Earth, *Geophysical Journal International,* **190**, 871-886.
5. **\*Evan Um**, Michael Commer and Gregory Newman, 2012, Iterative finite-difference solution analysis of acoustic wave equation in the Laplace-Fourier domain, *Geophysics*, **77**, T29-T36.
6. **\*Evan Um**, Jerry Harris and David Alumbaugh, 2010, Three-dimensional time-domain simulation of electromagnetic diffusion phenomena: a finite-element electric-field approach, *Geophysics*, **75**, no. 4, F115-F126.
7. **\*Evan Um** and David Alumbaugh, 2007, On the physics of the marine controlled source electromagnetic method, *Geophysics,* **72**, no. 2, WA13-WA26.

## Conference and Technical Presentations

1. **Evan Um**, Michael Commer and Gregory Newman, A framework for coupled inversion of large-scale seismic and electromagnetic data: application to subsalt imaging, *AGU Meeting*, 2013.
2. **Evan Um**, Michael Commer and Gregory Newman, Coupled electromagnetic-seismic imaging, Workshop Integration of Seismic and EM, *82th SEG meeting*, 2012.
3. Yingqiao Wang, Tengpeng Wei, Haohuan Fu, and **Evan Um**, A Parallel Finite-Element Solution of Transient Electromagnetic Diffusion Equation, *82th SEG meeting*, 2012
4. **Evan Um** and Gregory Newman, Fluid imaging of enhanced geothermal systems, Geothermal Technology Program, 2012.
5. **Evan Um**, Finite-element electromagnetic modeling in complex offshore environments, Chevron Energy Technology, San Ramon, CA, 2010.
6. **Evan Um**, David Alumbaugh and Jerry Harris, Lorenz-gauge finite-element solution for transient CSEM modeling, 2010*, 80th SEG meeting*, Denver, Expanded Abstracts.
7. **Evan Um**, Finite-element time-domain algorithms and its applications to marine CSEM simulations, Geophysics Department, Earth Science Division, *Lawrence Berkeley National Laboratory*, 2010.
8. **Evan Um**, Jerry Harris and David Alumbaugh, 2009, A finite element algorithm for 3-D transient electromagnetic modeling, *79th SEG meeting*, Houston, Expanded Abstracts.

9. **Evan Um** and Jerry Harris, 2009, Finite-Element Numerical Simulation of Transient Electromagnetic Diffusion in the Earth, *International Association for Mathematical Geosciences Annual Conference*.
10. **Evan Um** and Jerry Harris, 2008, Sensitivity study of time-domain controlled-source electromagnetic method for detecting geological $CO_2$ sequestration, *Global Climate and Energy Project Research Symposium*.
11. **Evan Um** and Jerry Harris, 2007, A feasibility study of the controlled-source electromagnetic method for monitoring $CO_2$ storage in coals, *Global Climate and Energy Project Research Symposium*.
12. **Evan Um** and David Alumbaugh, 2005, On the physics of the marine-time-domain controlled source electromagnetic method for detecting hydrocarbon reservoir, *75th SEG meeting*, Houston, Expanded Abstracts.
13. **Evan Um** and David Alumbaugh, 2004, On the physics of seabed logging (SBL) over 3-D hydrocarbon reservoirs, *74th SEG meeting*, Denver, Expanded Abstracts.

**Software Knowledge:**

1. Proficient with C, C++, FORTRAN and MATLAB.
2. Proficient with MPI and OpenMP.
3. Familiar with various parallel and serial linear algebra libraries (MUMPS, PARDISO, SuiteSparse, PETSC and Intel MKL).
4.  Familiar with finite-element modeling and mesh generation software (COMSOL MultiPhysics and TetGen)